I.   Introduction

My name is John L. Peterman. I am a Principal in Law & Economics Consulting Group, Inc. ("LECG"), a firm engaged in economic consulting.

I received a B.A. degree in economics from Drew University in 1959 and a Ph.D. in economics from the University of Virginia in 1964. In 1964, I joined the economics faculty of the University of Virginia. I specialized in the study of industrial organization. In 1966, I was named Fellow in Law and Economics at the University of Chicago Law School, and from 1967 through 1973, I was on the faculty of the University of Chicago Law School, where I taught the economics of antitrust. During 1974-75, I served as the Chief Economist of the Securities Investor Protection Corporation. From 1975 until joining LECG in 1994, I was an economist at the Federal Trade Commission ("Commission"), serving in a variety of research and management roles related to the antitrust activities of the Commission. From 1988 through 1993, I was Director of the Commission's Bureau of Economics. In that position, I was responsible for the economic analysis of the Commission's antitrust and consumer protection cases, investigations, and for the reports and studies done by the Bureau of Economics.

My field of specialization is industrial organization, which broadly involves the use of economic analysis to help understand the behavior of business firms and individuals in markets. Most of my antitrust work -- in teaching, research and at the Commission -- has been an effort to understand whether various business practices are anti-competitive. While at the Commission, I analyzed and participated in

comments dealing with the potential competitive effects of proposed changes in broadcast and other regulations being considered by the Federal Communication Commission.

I have done research on the pricing structures of the television networks and stations, on the differences between the levels of national spot and network television advertising rates, and on the effects of concentration of control of television stations and newspapers on television advertising rates. A copy of my curriculum vitae is attached.

I have been asked by CD Radio to comment on the arguments and evidence used by NAB to support its position that the Commission impose restrictions on Satellite Digital Audio Radio Systems (SDARS) or reconsider its position to authorize SDARS.

- In Section II of this paper, I set out NAB's main argument. It contends that the decrease in traditional radio's audience from SDARS and the resulting decrease in traditional radio revenues will reduce local programming by traditional stations and the number of traditional stations. In the discussion that follows, I show that NAB's basic contention is not supported theoretically or empirically.

- In Section III, I discuss the potential effects of SDARS on traditional radio revenues and show that the negative effect predicted by NAB is not a necessary or even likely outcome, because NAB and its experts fail to account for the upward pressure SDARS will exert on radio advertising rates. Consequently, reduced traditional radio revenues, the basic effect that drives NAB's predicted reductions in local programming and number of traditional stations, is not supported.

- Section IV discusses the consumer survey that NAB uses to estimate the diversion of traditional radio audiences to SDARS. I show that the survey has many weaknesses and in fact can support substantially less diversion than NAB predicts. For example, the NAB dramatically overstates consumer interest in SDARS by failing to account for the $300 receiver costs of subscribing to SDARS. This section also discusses the penetration of cable radio which suggests far less audience diversion than NAB predicts.

- Section V discusses possible effects of audience diversion on local programming and shows that the effect NAB expects is not supported theoretically or empirically. NAB does not show that local programs are less profitable relative to non-local programs with decreases in station audiences or market size. In fact, the finalists for the Crystal Station Awards in 1995 who are honored for out standing local service are proportionately located in very small markets and reach very small audiences.

- Section VI discusses the effect of SDARS on the number of traditional radio stations and gives evidence demonstrating that a significant decline in the number of traditional stations is unlikely. For example, even if stations are assumed to lose 10 percent of their audiences to SDARS they will reach audiences that are larger than the actual audiences of stations in other markets of similar size, indicating that stations that lose audiences remain of viable size.

- Section VII summarizes the Kagan study that NAB uses to indicate the negative effect on station revenues and cash-flows from SDARS. I show that this study is misleading and does not support a significant decrease in the number of stations. For example, the study does not

allow for longer-term cost adjustments in response to smaller audiences reached, which Kagan's data itself shows would be undertaken.

- Section VIII discusses the submissions of Fratrik and Miller, Kaplan that NAB uses to suggest a significant reduction in the number of stations from SDARS. These submissions do not support the contention. For example, they do not show that station profits are or will be so low as to cause license values to fall to zero or below, that efforts to enter have ceased, or that existing licenses are not being used.

- Section IX discusses the benefits of SDARS which NAB underestimates. For example, no benefit is assumed from the absence of commercials, better in-car reception, or the substantial increase in the number of formats and program diversity that SDARS would make available to a large part of the population.

- On the whole, NAB and its experts fail to carry their burden of demonstrating that public interest harm would result from the creation of SDARS.

II. NAB's General Argument

NAB's argument can be briefly summarized:

Satellite Digital Audio Radio System ("SDARS") will draw audiences away from traditional radio, and as a result traditional stations will, on average, reach smaller audiences.

The smaller average audiences per traditional station will have two effects:

a. Traditional radio stations will reach fewer listeners to sell to national advertisers in the national spot market and to network-radio advertisers. The reduction in listeners supplied to national advertisers is assumed to lower revenues of traditional radio stations.

b. Traditional radio stations will reach fewer listeners to sell to local advertisers. The reduction in local listeners is assumed to lower revenues from sales to local advertisers.

NAB contends that the reduction in revenues will have two effects, one that is emphasized more than the other. The supposed effect of SDARS emphasized less is that some traditional radio stations may fail--available audiences become so small that for some stations costs cannot be covered, so the license is no longer used. There is a loss to listeners from this. NAB does not present evidence on the likely extent of failure. The submissions of Kagan, Fratrik and Miller-Kaplan for NAB do no more than suggest the possibility of station failure. I later present evidence suggesting that the reduction in the number of stations due to audience diversion to SDARS is likely to be very small. This concern is implausible given the paucity of licenses turned back to the FCC over the past two decades notwithstanding the addition of 1000's of new radio stations.

The supposed effect of SDARS emphasized by NAB is that a reduction in station revenues will reduce the amount of "locally produced, community-related programming" that stations will supply. The argument on which NAB relies is that advanced by Dr. Haring and Mr. Shooshan of Strategic Policy Research. They argue that a diversion of traditional radio listeners to SDARS will cause a reduction in advertising revenues of traditional radio stations. In turn, the reduction in revenues is assumed to reduce the amount of "local, community based" programming that

traditional radio stations will provide. Haring and Shooshan admit that their argument is qualitative in character. They give the direction of the effect but not its magnitude. It is largely on this qualitative argument that NAB relies to conclude that the costs of SDARS will exceed its benefits. But even these qualitative results are not demonstrated. As I illustrate below, there are plausible reasons why (1) traditional radio station revenues will not fall significantly and (2) the amount of local programming traditional radio stations broadcast will not fall. In Section IV, I consider why SDARS need not cause traditional radio revenue to fall. In Section V, I consider why SDARS need not reduce the amount of local programming traditional radio stations broadcast.

III.   Theory Of SDARS' Effect On Traditional Radio Revenues

The diversion of audiences from traditional radio to SDARS can affect national advertising revenues of traditional stations. The magnitude of this effect will depend on whether or not SDARS carries national advertising. These two cases are discussed below, after which the potential effect of SDARS on traditional radio's local advertising revenues is considered. The latter is the more important effect in that over 80% of traditional radio revenues derive from local advertising.

A.   The Effect on National Advertising Revenues -- No SDARS Advertising Case

Consider first the argument that the traditional radio audience loss from SDARS will cause a loss in traditional radio revenues from national advertisers. Suppose that no SDARS offers advertising to its listeners. Then the supply of listeners available to national advertisers will fall, and advertising rates will tend to rise. The effect of higher rates on traditional radio revenue is ambiguous. The effect would depend on the elasticity of demand of national advertisers for traditional radio advertising, how the marginal cost of supplying listeners changes with changes in output, and on

the extent to which traditional radio stations will shift access to their listeners from local to national advertisers (which in turn would effect local advertising rates). Because traditional radio is a relatively small part of total national advertising, and national advertisers in general are likely to find other national advertising media good substitutes for traditional radio, the rise in national advertising rates is likely to be small. However, any rise in advertising rates would reduce the extent to which traditional radio stations' revenues fall and could offset any loss from national advertisers entirely.

B.   The Effect on National Advertising -- Some SDARS National Advertising Case

If SDARS competed in supplying listeners to national advertisers, then any price increasing effect on national advertising rates as just noted would be diminished. However, not all of the four SDARS firms propose to rely principally on advertising. Consequently, only some of the total listeners who divert to SDARS from traditional radio would be available to national advertisers. For example, the increase in listeners available to national advertisers from one SDARS firm alone would not offset the total loss to national advertisers of traditional radio listeners who divert to SDARS. As a result, national advertising rates would rise, although by less than in the case of no SDARS advertising.[1]

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[1] If advertising were prohibited on SDARS, national advertising rates would rise by more. NAB favors such a prohibition: presumably any loss in traditional radio revenue from national advertisers will be less, so the alleged effect of reduced traditional radio revenue on "local" programming is lessened. NAB gives no consideration to the value of the additional advertising that would occur if SDARS were not prohibited from supplying advertising. If the "local programming effect" alleged by NAB does not hold up, no reason is advanced by NAB to justify the elimination of competition between SDARS and traditional radio for national advertisers.

C.   The Effect On Traditional Local Advertising Revenues

Consider next the effect on local advertisers of the diversion of traditional radio listeners to SDARS. NAB assumes that this diversion will have no effect on local advertising rates, so traditional radio necessarily incurs a revenue loss. The loss arises from the fact that the stations have fewer listeners to sell to advertisers. This revenue loss triggers the local programming effect on which NAB relies.

However, a reduction in traditional radio listeners will likely cause local advertising rates to rise. The extent to which rates rise will depend on the elasticity of demand of local radio-advertisers and on how the marginal cost of supplying listeners changes with changes in output (as well as on the effect of traditional radio stations diverting their listeners from national to local advertisers).

When compared with national advertisers, local advertisers have fewer substitutes for radio. For many local advertisers, newspapers and other local media may not be close substitutes for radio. Consequently, the demand for local advertising on traditional radio may be inelastic. In that case, a reduction in the number of traditional radio listeners would lead to a proportionately greater price increase per listener reached and greater revenues.

Working to offset this revenue increase would be the competition of the traditional radio stations to provide additional listeners at the higher price. However, even if the marginal cost of producing additional listeners increases (assuming a market of given population size), traditional radio stations can nonetheless end up with greater net revenues. That the marginal cost of producing additional listeners will increase is likely.

Consider a market with given population. Some of this population (but not all) listens to traditional radio and by different amounts and degrees of interest. Suppose that some of these listeners divert to SDARS, so that a smaller fraction than before of the total population listens to traditional radio. To generate the same number of listeners as before, traditional radio stations must attract listeners who previously either did not listen or listened less than listeners who divert to SDARS. To attract such listeners, program and/or promotional costs will rise. It is the counteracting forces between higher costs and higher prices that determine whether net revenues of traditional radio will increase.[2]

I illustrate in Figure 1 a situation where net revenues from local advertising will increase with a diversion of listeners from traditional radio to SDARS. Let D be the demand per listener/minute of local advertisers. Stations supply these listeners by providing programs at a cost that (in a market with population X) is illustrated by curve C. With competition, the price per listener is OP and OA listener/minutes are supplied. SDARS enters and diverts listeners from traditional radio. This diversion has no effect on D. However, the cost of providing listener/minutes by the traditional radio stations is now higher. Let this be illustrated by curve C_1. Price rises to OP_1 and output falls to OA_1. Prior to SDARS, more listener/minutes are sold but they are sold at a lower price. After SDARS, fewer listener/minutes are sold but they are sold at a higher price. Whether station net revenues would increase after SDARS depends on whether total revenue rises by more than total costs. Returning to Figure 1, before the price increase, the difference between total revenue and total cost (or net revenue) is equal to the area abP. After the price increase, net revenue is equal to the area cdP_1. If area abP is

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[2] See Salop and Scheffman, Raising Rivals' Costs, 73 American Economic Review 267 (1983).

FIGURE 1
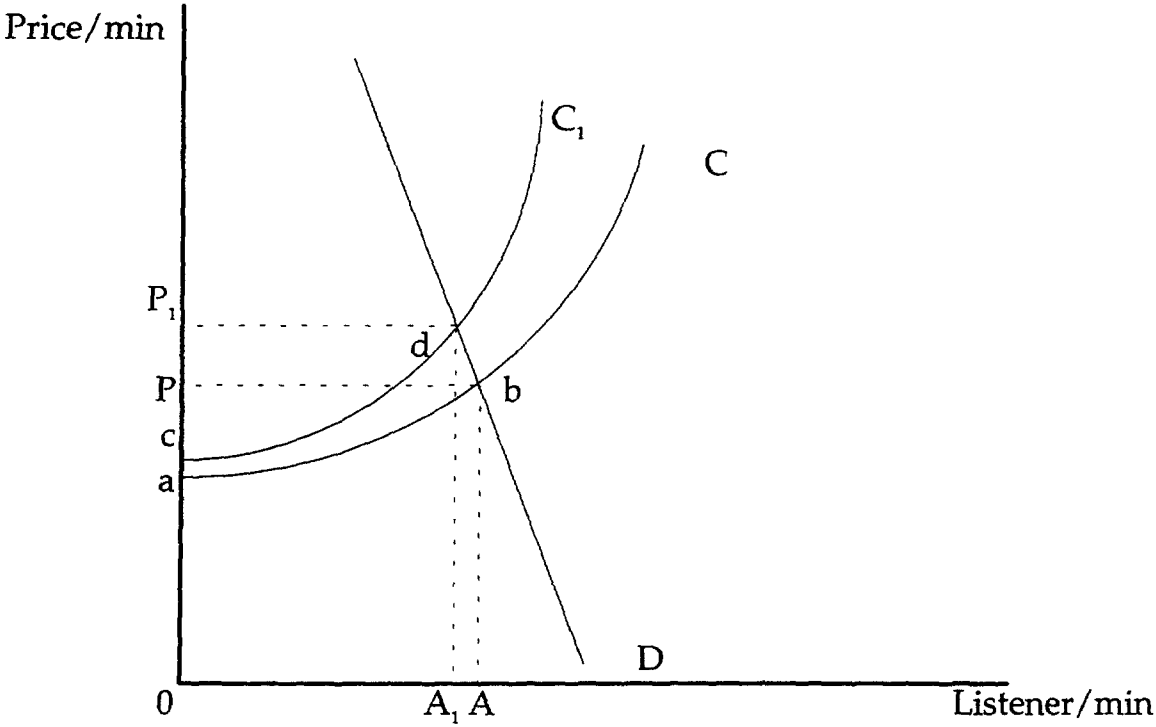
less than area cdP_1, net revenues would increase. In Figure 1, net revenues increase.

None of NAB's experts considers this possibility. They simply assume that lost audience equates to lost revenues. Haring and Shooshan assume no price effects so that audience diversion to SDARS will cause a revenue loss and a reduction in local programming. The Kagan submission similarly assumes that a diversion of audience to SDARS will not affect price, so that its only effect will be to reduce traditional radio revenues. Kagan makes no claim about the effects of a revenue reduction on local programming.

IV.   The NAB Audience Diversion Survey and SDARS Penetration Rates

Putting aside the important theoretical problems with NAB's assertions that reduced audiences will reduce traditional radio's revenues, NAB does not show that SDARS will reduce significantly traditional radio's audience. I first consider NAB's survey regarding consumer acceptance of SDARS. Then I consider the analogous experience of cable radio as a basis for estimating the likely effect of SDARS on traditional radio station ratings.

NAB presents a survey of 1000 adults (18 and over) made by Opinion Research Corporation to estimate listener diversion from traditional radio to SDARS. The survey seeks information on the appeal of SDARS and how that might affect the amount of time spent listening to traditional radio. The respondents' answers should be considered "guesstimates" because the survey addresses a service not presently existing, listened to, or fully described. Forty-eight percent of the respondents indicated that they were "interested" or "very interested" in SDARS if offered "free" and without commercials. They also were asked to indicate their degree of interest in SDARS if offered "free" with commercials, and if offered with a $5/month subscription fee. The respondents also were asked to indicate the extent to which

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they would reduce their traditional radio listening if they had SDARS service. The proportion of respondents "interested" or "very interested" drops from 48-50 percent when the service is offered "free" (either with or without commercials) to 28 percent when the $5 fee is imposed.[3]

The survey suffers from several flaws. Figures are not separately reported for the "very interested" respondents, although this group may be the most likely or the only group to subscribe to SDARS. "Interested" or "very interested" has no clear meaning, so it could be that 28 percent of the respondents might examine more closely whether to purchase SDARS and only some fraction of this group might do so in fact. The survey does not include any price points other than $5/month. CD Radio proposes a fee of $10/month, not $5/month. Also important, no consideration is given in the survey to the additional equipment costs necessary to receive SDARS. A new receiver will likely cost $300, which corresponds roughly to an additional charge of $5.00 per month for five years.[4] Given the sharp drop in the proportion of "interested" or "very interested" respondents when a $5/month fee is imposed, these added costs could have a pronounced effect in reducing the "interested" and particularly the "very interested" groups -- and of course on actual purchases. The 28 percent figure is based on an underestimate of SDARS' cost. Considering $10/month and equipment cost, a more realistic estimated monthly charge would be $15.00. The underestimate of cost could be fatal to the survey results. The survey respondents seemed very responsive to the service's cost.

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[3] More respondents expressed interest in SDARS service offered free with commercials (50 percent) than free without commercials (48 percent). This is surprising in that the normal presumption is that commercial free is favored over service with commercials, all else the same. This outcome could reflect response bias induced by the sequence of the questions. Respondents may have compared the final alternative of a free service with commercials against the preceding question stating a $5/month subscription charge. It cannot be assumed that the respondents were expressing a genuine equality of preference for commercial-free versus commercial-induced service.

[4] That is, $300/60 months equals $5/month. I simply assumed this equipment would last five years with nothing by way of resale value after that.

Even given these important failings, the study's results show little adverse impact on traditional radio and in some cases support creating SDARS.

1.   The survey asks all respondents to indicate the extent to which they would listen less to traditional radio, assuming each respondent had access to CD-quality SDARS. In other words, all respondents were to assume they had SDARS (as opposed to those either who were "interested" or "very interested" in SDARS if it were free, or were still interested in SDARS if $5/month is charged). Of all respondents, only 20 percent indicated that they would listen to traditional radio less. Interestingly, this figure suggests that for the bulk of listeners audience diversion to SDARS from traditional radio would be zero. By implication for most respondents any SDARS listening would be additional listening due to the added choice and other benefits of SDARS. In that case their SDARS listening would have no impact on traditional revenues and local programming. Thus NAB's own study shows for this group substantial consumer gain and no loss to traditional radio.

2.   The NAB survey indicates that SDARS listeners will continue to listen to traditional radio almost one-half the time. Although details are not given, the survey indicates that for all respondents, traditional radio listening on an hours-per-week basis would decline 11.6 percent. Since for 80 percent of the respondents traditional radio listening would not decline at all, then to get traditional listening down 11.6 percent, the 20 percent of respondents who listen to traditional radio less would have to reduce their listening substantially. If the total hours of radio listening per respondent by the 20 percent group is the same as for the 80 percent group, then the 20 percent group would reduce their listening to traditional radio by 58 percent, or

somewhat more than one-half.[5] This number is noteworthy because it supports the conservative nature of the InContext estimate of revenue loss from SDARS. In its worst-case estimate of 3.1 percent revenue decline for traditional radio in 2004, the InContext study assumes that SDARS subscribers never listen to traditional radio again. If listenership of traditional radio declines only by 58 percent by those who listen to SDARS, then the InContext worst case revenue loss would equal 1.7 percent (.031 x .58 = 1.8 percent).

3. Because the survey is based on expressions of interest using an underestimate of the likely monthly costs of SDARS, it overstates the likely impact of SDARS on traditional radio station ratings . To get an idea of the effect of this, suppose that the 28 percent of survey respondents who were "interested" or "very interested" in SDARS if $5/month is charged represents the group potentially likely to purchase SDARS. Suppose further that this group is distributed in the same way as the total survey group in terms of reductions or not in listening to traditional radio. That is, 80 percent of them will listen to traditional radio no less than before, and 20 percent will reduce their listening by 58 percent. If so, then the decrease in listening to traditional radio by this group would fall to 3.2 percent,[6] which is far less than the 11.6 percent used by NAB. Total listening overall would fall by only .9 percent.[7]

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[5] Only if the 28 percent of respondents who were "interested" or "very interested" in SDARS when $5/month is imposed contained the whole of the group of 20 percent of respondents who would listen to traditional radio less would the decline in listening to traditional radio remain 11.6 percent.

[6] Thus, suppose that of 100 consumers 28 subscribe to SDARS. Of the 28, 80 percent listen to traditional radio the same and 20 percent reduce their listening by 58 percent. Then for the 28 subscribers, listening drops by (28)(.20)(.58), which equals 3.2 percent.

[7] Total listening for the 100 consumers would fall by less: of 100 consumers, only 28 subscribe and they reduce their listening 3.2 percent. Total listening would drop by .9 percent. Thus, 28 (.032)/100 + 72(0)/100 = .9 percent.

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An alternative estimate of audience diversion can be made using the experience with the penetration of cable radio. Based on information from CD Radio, I understand that both cable and CD Radio offer high-quality sound and many channels, although cable radio now offers 120 channels versus 30 to 50 for CD Radio. But CD Radio can be received in cars, where about one third of total radio listening occurs. For many listeners this could raise the value of CD Radio over cable radio, and could increase its penetration relative to cable radio. Cable radio, however, typically costs $10/month with no separate charge for equipment or decoding. The monthly fee equals what CD Radio contemplates, but reception of CD Radio requires equipment that may cost the subscriber $300. Considering price alone, cable radio should have greater penetration than CD Radio. This difference could be important. At one point cable radio experimented with a $150 equipment charge and $5/month fee, but this was unsuccessful and quickly abandoned, which suggests potentially adverse effects for CD Radio. On the whole, experience with cable radio should provide one of the better predictors of SDARS penetration rates.

Cable radio passes about 50 percent of all cable homes and by 1995 the number of subscribers to cable radio was 500,000 homes. There has been little or no increase in subscribers over the past year. The service began in 1990 or 1991. In 1993 there were about 59 million cable homes. The figures suggest that about 1.7 percent of cable homes passed subscribe to cable radio (.5/29.5). If we assume that (a) the number of cable homes equals the number of radio homes (b) that cable radio subscribers never listen to traditional radio and (c) that SDARS and cable radio are considered of comparable value by consumers, then the diversion from traditional radio to SDARS would equal 1.7 percent of traditional radio's audience. This figure may be too low because there are more radio homes than cable homes. Also, SDARS may be preferred to cable radio because of its in-car features. But even if SDARS achieves a penetration rate two times greater than cable radio, the diversion would amount to 3.4 percent of traditional radio's audience. Further, NAB's consumer survey suggests that SDARS subscribers would only reduce their listening

to traditional radio by about one-half, in which case the diversion would be about .9 to 1.7 percent, given the range of figures above. All in all, NAB's estimate of an 11.6 percent diversion of traditional radio's audience to SDARS appears to grossly overestimate the effects of SDARS on traditional radio's revenues, local programming and station failure.

V.   SDARS Effects on Local Programs

The main concern of NAB is the loss of "local, community based programming" that it believes will result from a decline in station revenues from the diversion of listeners to SDARS (and possibly from a reduction in the number of traditional radio stations from such diversion). NAB does not explain why a fall in station revenues from a reduction in listeners leads to a reduction in local programs nor is any systematic evidence presented to support the proposition.

Haring and Shooshan also provide no explanation. They draw on suggestions of what local stations might do drawn from their interviews of traditional radio operators in six very-small markets. The choice of such small markets is curious. The interviews are offered as evidence that these small stations provide important and high quality local programming that will be jeopardized by SDARS. According to Haring and Shooshan, however, these stations would not be expected, given their small size and revenues, to provide significant local programming. If they currently do, SDARS would not reduce local programming by stations that reach larger audiences, which includes most stations. The supposition appears to be that if a station's audience falls, the stations will shift to non-local programs because such programs become more profitable. This need not be the case. I explain below why this might be so.

Actual results would depend on program costs and audience responses. Nothing in NAB's submission deals with either. There is no evidence systematically presented

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that shows why or by how much traditional stations will broadcast less local programming with a decline in audiences reached. NAB and its experts fail to show why local programming becomes less profitable with a decline in traditional radio audiences, and it is easy to generate situations where this is not so.

For example, suppose that advertisers value each listener the same whether the listener is tuned to a local or non-local program. Suppose also that revenues from programs are proportionate to audiences, so that a given change in audiences leads to a proportionate change in revenues. Before the advent of SDARS, suppose that station A spends $10 on a non-local program that generates an audience of 100 and that this is the most profitable program for it to broadcast. Let this program generate revenues of $15 and a profit of $5 ($15-$10). After SDARS enters, let the program's audience fall by 10 percent. In that case, the station might find it more profitable to broadcast a local program that costs $9 that reaches 85 listeners, and that generates revenues of $12.75 and a profit of $3.75 ($12.75-$9); or more profitable to broadcast a local program that cost $9 that reaches 81 listeners and that generates revenues of $12.15 and a profit of $3.15 ($12.15-$9). In either case, each such program could be more profitable than any non-local program that is alternatively available. Thus, the best alternative non-local program may be an expenditure of $9 on a program that reaches an audience of 75 and generates revenues of $11.25 and a profit of $2.25 ($11.25-$9); or perhaps an expenditure of $5 that reaches an audience of 45 and generates revenues of $6.75 and a profit of $1.75 ($6.75-$5).

In fact, absent other program changes, the diversion of listeners to SDARS could lead station A to put on relatively more local programs, spend more in total on them, and reach more listeners with such programs than before. It also could be that the other stations in the market (and therefore the market as a whole) put on more local programs and spend more on them than before.

It also should be noted that the advent of a national SDARS service in competition with the traditional stations might well lead to greater specialization in which the traditional stations broadcast more local programming -- because this is what they have an advantage in providing -- and because greater audience fragmentation can lead the competing local stations to seek out fringe and niche audiences to a greater extent than before. In that case, SDARS might actually increase local diversity. Frankly, NAB has hardly touched the issue although it is crucial to its case.

If it is true that less local programming is broadcast when stations reach fewer listeners, then the entry of new stations after the 80-90 proceedings should have resulted in less local programming on stations whose audiences fell. Similarly, stations that reach "smaller" audiences because they are in smaller markets would have fewer local programs or spend less on them. NAB does not support either proposition. As noted above, the Haring and Shooshan interviews indicate that in very small markets stations are providing high quality local programs. I considered empirical evidence presented by NAB that also bears on the latter point. Taking the Crystal Radio Award Finalists for 1995 that NAB presents as evidence of the local, community based programming it fears will be lost, we would expect the finalists disproportionately to be stations in larger markets (where station revenues are larger). Thirty one percent of the finalists are in markets ranked 151-261. Thirty percent of all stations are located in these markets. These markets contain about 8 percent of the total population. Thus, this evidence of programming excellence does not support NAB's hypothesis that stations reaching smaller audiences will provide less local programming. (See Attachment 1.)

To support its contention that reductions in audience size will reduce local programming, NAB relies primarily on the six-market interviews by Haring and Shooshan to suggest that audience fragmentation due to SDARS would result in a loss of local programming. The evidence is anecdotal. It does not estimate the likely extent of reductions in local programming, the magnitude of the audience

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diversion on which any such reductions are based, or why local programs become less profitable than non-local alternatives. It also is not noted, if one station is assumed to decrease its local programming, what incentives would exist for the other stations to increase their local programming. The overall effect is not considered.

The interviews involve stations in very small markets. Even accepting at face value the contention that further fragmentation could lead to a reduction in local programming by particular stations, the effect of such fragmentation in the six markets or in other markets of this size is not shown empirically or generally, nor is it obvious that any such program effect, assuming it would occur in very small markets, would also occur in markets that are larger. Substantial evidence is not presented.

On the whole, from both theoretical and empirical perspectives, NAB has not shown that the entry of SDARS would decrease local programming significantly if at all. As a consequence, it has not shown that the consumers' loss from reductions in local programming would offset the consumers' benefit to those who choose SDARS. The diversion of listeners to SDARS could lead traditional stations to put on more local programming.

VI.   The Effects of SDARS on the Number of Traditional Radio Stations

NAB also expresses concern that traditional radio stations will fail because of listener diversion to SDARS, but it does not examine how important this effect might be. Station failure would depend in part on the extent of audience diversion, which may be significantly less than the 10 percent or more that NAB relies on (based on its survey discussed above). Would a 10 percent reduction in each station's audience cause significant failure (by which I mean the station's license would no longer be used)? In the longer term, each station will attempt to adjust to the fall in the size of its audience. Whether failure occurs would depend importantly on whether the

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station's audience becomes so small that minimum average cost rises above the average costs of stations that reach larger audiences, so that the small station is no longer viable. If there is such an effect, it is unlikely to be significant. I say this because in most markets stations operate that reach very different audience sizes.

In fact, if traditional radio stations currently earn returns such that their licenses have positive market values, then a decrease in traditional radio audiences brought about by SDARS that decreases traditional radio station revenues (which need not happen) could leave the number of stations unaffected. That traditional radio station licenses have positive values is consistent with the fact that the additional entry after the 80-90 proceedings did not cause existing licenses to be returned; nor is it clear that incentives to enter traditional radio do not exist currently.

The likely viability of stations that might reach smaller audiences because of SDARS is demonstrated in Attachment 2. There I list each station and the number of its listeners (12 years and older) for each of 87 Arbitron markets. The markets are ranked in descending order, beginning with the largest market and skipping down to the third next market (markets 1, 4, 7, and so on). I assume that each market loses 10 percent of its listeners because of diversion to SDARS. This total audience reduction is then distributed across stations proportionately, so each station is assumed to lose 10 percent of its audience. The adjusted audiences are listed for each station for each market. Take any market (say Market A) and find the station with the smallest adjusted audience. Let this audience be X. Are there stations in markets somewhat larger and smaller than X that reached audiences (before adjustment) as large as or smaller than X? If yes, all of the stations in Market A after the audience reductions would seem of viable size. If the station with the smallest adjusted audience does not meet the test, consider next whether the station with the next largest adjusted audience meets the criterion. If it too does not meet the criterion, move again to the station with the next largest adjusted audience to see

if it meets the criterion, and so on. The number of stations not meeting the criterion relative to all stations is recorded.

The experiment is done for each market. For this test, the markets are grouped into different population size-classes. The reason for restricting the search to similar-sized markets is to adjust roughly for cost factors that may relate to market-size. However, such differences may be small if they exist at all. For each market in each classification, we sought to uncover whether the smallest adjusted audience was equal to or larger than the unadjusted audience of any station in other markets within the same population-size class. In each population size-class, there will be one station (except for ties) with an adjusted audience that is smaller than that of any other station. For these stations, the audience comparison was made with stations in the next smallest population-size class. For markets with populations up to 100,000, 100,000-150,000, 150,000-200,000, 200,000-300,000, and 300,000-400,000, all stations meet the criterion. So far as NAB's concern with audience diversion and station failure relates to smaller markets, the concern is not supported by this data. Interestingly, in a few markets of over 400,000 population, there are some stations[8] that did not meet the criterion. For example, in markets of 400,000-700,000, there is one such station; in markets of 700,000-1,000,000, there are three stations; and in markets of over 1,000,000, there are three stations. These stations represent .3 percent of all stations in the sample.[9]

All in all, 99.7 percent of all stations (and 100 percent of all stations in markets with populations up to 400,000) after their audiences are reduced by 10 percent continue to reach audiences that are equal to or larger than the audiences reached by existing stations in similarly-sized markets. It does not follow that even the limited number

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[8] Excluding the station with the smallest audience in each city size-class.

[9] All of these stations meet the criterion if their adjusted audiences are compared with the unadjusted audiences of stations in markets in the next smallest city size-class.

of stations that do not meet the criterion would turn in their licenses. First, the test is conservative in that the search was limited to markets not far removed in size from the market under consideration. If the search is extended -- only slightly -- all stations meet the criterion. Second, the audience reduction is assumed to be 10 percent. If the audience fell by less than this, the number of stations that do not meet the criterion would fall.[10]

VII. The Kagan Study

The Kagan study is used by NAB to show the effect of an audience loss on traditional radio stations' net revenues. From this, implications are drawn concerning the effects of SDARS on traditional radio stations' net revenues, since SDARS is assumed to reduce traditional radio stations' audiences (by 11.6 percent according to NAB's survey). In turn, traditional radio stations' revenues are assumed to be reduced by the same amount. According to NAB, a revenue loss translates to a loss in "local" programming. A reduction in "local" programming is not shown directly by Kagan. The Kagan study examines only the relation between station audiences and revenues. NAB also infers that a reduction in "local" programming may come from a reduction in the number of stations. A reduction in the number of stations also is not directly shown by Kagan.

Kagan undertakes two analyses. In part 1, Kagan estimates the reduction in revenues and cash-flows from a reduction in audiences reached by different sizes of stations in a market with fixed advertising revenues; part 2, which is similar to part 1, shows the

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[10] We made a second test similar to the first. For this test, the smallest adjusted audience in Market A is compared with the unadjusted audiences of stations in the next two-smallest and next two-largest markets that surround Market A. Within this range, the markets typically do not differ greatly in size. Just over one percent of all stations do not meet the criterion. If we use the next three-smallest and next three-largest markets that surround Market A, the proportion of stations that do not meet the criterion falls to .7 percent. Again, it does not follow that such stations would turn in their licenses. (See Attachment 3.)

decline in average station revenues and cash flows in 36 markets where entry of new stations caused existing stations to lose audiences.

Table 1 of Kagan, which reflects its general approach, estimates the change in revenues of a "top-rated", "mid-rated" and "low-rated" station in a market with total advertising revenues of $25 million. Each station is assumed to lose 5, 10 and 15 percent of its audience that results in a proportionate fall in gross revenues. The effect of the fall in revenues on each station's cash-flow is then estimated. To do this, costs are subtracted from revenues. Much of the stations' costs of operations are assumed to be fixed, and these costs are large relative to revenues. For the high-rated station, fixed costs equal 37 percent of gross revenues before any audience reductions; for the mid-rated station, 50 percent of such revenues; and for the low-rated station, 59 percent. Assuming these declines in audiences and revenues and that costs are substantially fixed, the study shows that cash-flows fall.[11] I believe this analysis is misleading and simplistic.

The fundamental problems with Kagan's analysis in part 1 are the assumptions on which it is based. First, a reduction in audiences is assumed to have no effect on local advertising rates. As discussed before, local advertising rates would likely rise,

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[11] Kagan assumes audience reductions of 5, 10 and 15 percent. With roughly one-half of the stations' costs fixed, cash-flows fall with the audience reductions. Again, for the high-, mid- and low-rated stations by 21 percent, 35 percent and 70 percent respectively, when audiences are assumed to fall by 10 percent. The reductions in cash-flows are smaller if audiences fall by 5 percent; they are larger if audiences fall by 15 percent. Part of the difference between stations in fixed costs relative to revenues stems from Kagan's assigning a higher "power-ratio" to the high and mid-rated stations than to the low-rated station. The power ratio indicates the extent to which a unit of audience reached by one station sells at a premium over a unit of audience sold by another station. A power ratio of 1.2 means that the station sells a unit of audience at a 20 percent premium over a unit sold at the market's mean price. The power ratio itself probably reflects program and other expenditures of the station to secure particular demographics, although this is not stated. If station revenues are assumed to be proportionate to audiences, then the ratio of fixed costs to revenue for the high-, mid- and low-rated stations are 52 percent, 57.5 percent and 59 percent. The differences among the stations in the proportionate reductions in cash-flows would be substantially less if revenues were assumed proportionate to audiences.

diminishing the effect of any audience loss on station revenues. Net revenues could even rise, in which case Kagan's results would be reversed.

Second, the components making up fixed costs can and probably would be adjusted in the longer-run in relation to audience size. For example, before the audience reductions, the mid-rated station had an audience only 53 percent of the high-rated station, but its fixed costs were 59 percent of the high-rated station's. It seems clear that over time stations that reach smaller audiences will have lower costs. If so, the assumption implicit in Kagan's analysis that stations that lose audiences will not react by adjusting costs is incorrect. In fact, if long-run station costs are on average constant per listener reached, there would be no necessary or negative effect on cash-flows per listener. The figures in Kagan's study do not suggest an outcome far from this. And surely support is given by the very wide range of audiences reached by different stations in almost all markets. Such differences have persisted for a long time. The differences in costs as may exist among stations may reflect different expenditures to generate different audience demographics (or station reputations) to influence the power ratio. Under competition, the added cost of these efforts would be just covered by the higher price per listener with these demographics (or sold by these stations) with no effect on the cash-flow per listener reached. All-in-all, the first part of Kagan's analysis does not show that in the longer-run cash-flows per listener will decline, that the number of stations will fall, that price per listener will fall, or that the amount of local programming will be reduced (as predicted by NAB).

The second part of Kagan's study examines 36 markets in which FM entry has occurred over the period 1985-1993. In these markets, from 1 to 14 stations have entered, the average being 6 per market. Kagan shows that entry has reduced the average share of listeners per station, and this has reduced the average station's gross revenues. This is so even though, on average, the total number of listeners per market has grown. Presumably, the entry of new stations could have depressed advertising rates, although this not examined. The decline in average station

revenues is assumed to stem entirely from a reduction in the average station's audience share.

The sample of 36 markets is broken into three groups: large markets (markets ranked 1-44); medium markets (45-136); and small markets (137-200). For each market group, average revenues are shown to fall per station, but the effect is more pronounced in small markets. Presumably, entry of a new station in a small market has a greater relative effect on the shares of the other stations than is true in larger markets, and this is reflected in Kagan's figures. This is not surprising.

Given the decline in average station revenues, average station cash-flows are shown to decline. However, these estimates are based on fixed-costs estimated before any decline in station shares or revenues, and again they are assumed to remain fixed after entry. There are no cost adjustments that the stations make with reductions in their audiences (in this case because of station entry rather than diversion to SDARS). However, stations reaching smaller audiences and with smaller revenues have lower costs. Consequently, my previous comments about constant cash-flow per listener apply to the second part of Kagan's study as well. Suffice it to note, there is no evidence that the entrants or incumbent stations have failed (or that their stations have gone dark), or that entry has caused existing stations to fail or go dark.

Finally, the Kagan study finishes by asking us to conclude, in light of the negative effect on station revenues from the entry of an average of 6 stations per market, that the "onslaught" of the 21-31 new channels to be offered by each SDARS firm will have a "devastating" effect on traditional radio stations, particularly traditional radio stations in small markets. Kagan seem to view each SDARS channel as individually offered and comparable in character and perhaps in magnitude to entry of a new traditional radio station in each market. Kagan presumes that if six entrants caused reductions in the cash flows of the average station of 52 percent in large markets, and 122 percent in small markets, then the entry of SDARS with 21-31 channels per